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ENGINEER-IN-CHIEF GEO. W. MELVILLE, U. S. NAVY

THE

National Geographic Magazine

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THE EFFECTS OF GEOGRAPHIC ENVIRONMENT IN THE DEVELOPMENT OF CIVILIZATION IN PRIMITIVE MAN*

By HON. GARDINER G. HUBBARD, LL. D.,

President of the National Geographic Society

I have selected as the subject for my annual address "The Effect of Geographic Environment on the Development of Civilization in Primitive Man."

The interest of this subject is not confined to the history of the various stages of life through which man has passed, for his past modifies our views of the present and is a prophecy of the future.

It is my province to treat of the effects of different environments on the development of primitive man. This development, though on the whole beneficial, has ever been a mingling of good and evil. Its progress has been hitherto intermittent—originally very slow, requiring thousands of years, possibly tens of thousands, to gain slight results; advancing sometimes with quicker pace, often retrograding, sometimes apparently dying out, probably because its progress is often invisible. It has never been uniform in any race, nation, or country, though progressing more rapidly in higher stages and in modern times.

That civilization has been and must be beneficial to mankind we cannot doubt, though every upward step has been the cause of suffering, loss, and death in many ways before unknown. The discovery of America was followed by the death of tens of thousands of negroes in Africa and of Indians in America. The cit-

* Annual presidential address, delivered before the National Geographic Society, March 1, 1897.

tization of the Hawaiian and other islands of the Pacific ocean caused a great diminution in the number of their inhabitants and the entire extinction of some tribes. No discovery or invention was ever made, whether of fire, of the bow, of gunpowder, of printing, steam, or electricity, of the telegraph, telephone, or bicycle, that did not bring with it changes in civil, social, and private life and in business transactions. The greater the value of the invention, the greater the disturbance of established habits, trade, and business. The cotton gin enriched the South, but made slavery profitable and led to our civil war. The railroad, steamship, and telegraph revolutionized the entire commerce of the world, and ruined many wealthy and long established mercantile and commercial firms. The civilization of past ages was never the enlightenment and elevation of the whole nation, it was the upbuilding of the higher classes in knowledge, culture, wealth, and power, and the oppression and debasement of the lower classes.

Comfort, happiness, and length of life are ever increasing with civilization. Individual strife is prevented by law, warfare is controlled, new and improved varieties of food, shelter, and clothing add to the sum of human happiness. Civilized man has become a highly developed and sensitive organism, with increased susceptibilities to both pain and pleasure. It is the purpose and effect of modern civilization to offer opportunities which shall raise the whole race to an elevation never yet attained.

One of the most striking features in the development of civilization, though hitherto little considered, is its relation to and dependence on geographic environment. In our earliest studies of man we find him the creature of his environment, only progressing in those directions and at that rate to which he is forced by his necessities. As we follow him through different and progressive stages of development, we find still the influence of geographic environment in directing, in stimulating, or retarding his progress. Indeed, so marked is the effect of geographic environment on any primitive people that, given the environment, the geographer can determine the character, religion, and habits of life of that people.

We were formerly taught that some four or five thousand years back in the world's history a man, perfect and complete, was created, the ancestor of the human race, to whom was given lordship over the beasts of the field and the fowls of the air and dominion over all nature. Modern research and the discovery

of the remains of ancient man have proved that no less than twenty thousand years, probably a much longer time, has passed since he first appeared upon the earth, and that he was then little superior, either in mental or moral qualities, to the animals by which he was surrounded, while greatly their inferior in strength. Whatever his origin, the causes which lifted him from this low estate proceeded from without and not from within.

The earliest traces of man are found in what is known by geologists as the Pliocene formation. They lie buried in deposits of gravel or in caves, and consist of fragments of chipped flints pointed into spear or arrow heads, and of bones (and in some cases of stones) shaped into rude fish-hooks.

With these flints are found bones of animals, with probably a few human bones. From these remains we gather that man had not only learned to defend himself from the wild animals about him, but probably to use their flesh for food and their skins for clothing. He lived in caves, in trees, or in rude huts sometimes built on piles or shell walls sufficiently separated from the land to make him secure from attack. We have no evidence that the use of fire was known to him. Gradually, step by step, we see him by slow advances become through geographic environment a hunter, a fisherman, a nomad. From a dweller in caves and trees he becomes a dweller in tents—finally gathering into families, tribes, cities, nations.

So much and so little do the gravels of river beds and rocks tell us of early man. But in existing peoples, in various parts of the earth—in the Dwarfs and Hottentots of Africa; in the Andamans of the Indian ocean; in the Papuans of the islands of the Pacific; in Tierra del Fuego; in the aborigines of Australia; in the inhabitants of the Arctic regions—we find man still in a very low stage of development, corresponding to, and little superior to, that of the drift and cave men. That these races have continued through so many ages in the same condition, and that others have risen through successive stages to the highest civilization, we believe to be the result of geographic environment. Had the environment been everywhere the same, progress must have been the same over the whole earth. But with every degree of latitude, every change of altitude, every variation of climate, every variation of rainfall, conditions are changed and progress is hastened or retarded.

Let us go back to primitive man as we still find him in Equatorial Africa, in the Arctic regions, in Central Asia, as he was in

Europe for countless ages, and trace the effect of geographic environment on his condition in each of these countries.

The whole of Africa was at one time probably occupied by the Dwarfs or Hottentots. The climate is warm, clothing is unnecessary; they require but slight shelter for protection against sun and rain. Their dwellings are either in trees or rude huts, with thatched roofs, sometimes open on every side. The streams and jungles furnish fish, birds, and animals for food and also roots and fruits. They become expert in laying snares and traps, in catching fish, and in hunting. Further needs they have none. There is neither necessity nor inducement for other exertion or for further development. Their environment has made them and keeps them what they are. A stronger race of negroes from the north, with better weapons, drove them into the hottest jungles of Central and South Africa; there they remain. Again, other races appeared, and to maintain their position the negroes must improve their weapons, must learn to make bows and poisoned arrows, spears and javelins, must clear spaces in the forest, erect palings around them, gather within these enclosures, and invent a system of alarms. To protect themselves from wild beasts they learned the use of fire and invented means of lighting a fire by friction. Gradually they gathered into families, and fire was used for cooking animal food. Sometimes the meat was hung over the fire on a spit; sometimes cooked in ant-holes with hot stones. The date and cocoanut palm supplied them with food, shelter, and light. They had advanced a stage beyond the Dwarfs and Hottentots, but as their environment encouraged no further progress they remained stationary.

In the Arctic regions the environment and therefore the conditions of life are different, but equally unfavorable to progress. In these regions clothing is a necessity, and to obtain the skins of sea and land animals the Arctic man was driven to invent snares and weapons and to make rude boats. In a land of snow and ice he must have a warm, tight shelter as well as clothing; so he builds huts of blocks of stone or ice covered with snow. He makes a fire and gathers moss for fuel. As his surroundings afford him scanty vegetable food, and that only in the short summer, he dries berries and mosses; he smokes and freezes the flesh of bear, seal, and walrus, and lays in a supply for winter use. The animals which surround him are generally not the ferocious beasts of warmer climates; the dog and reindeer become his companions and friends. Gradually he learns to use them

in his service, and thus from the environment came the domestication of animals in the Arctic regions. The denizen of the far north cannot cultivate the ground, for the frozen earth refuses to yield any return for his labor. All the energies of the Arctic man are expended in contending with the elements and striving to secure from sea, snow, and ice the oil, skins, food, and habitation necessary for the support of life. His body is enervated by the intense cold, and his mental, physical, and moral growth is dwarfed and stunted.

Thus we see that the geographical environments of intense heat and intense cold develop different faculties, but in neither does man progress toward civilization.

Let us turn to a temperate climate, to the vast steppes and plateaus of Asia, which extend from southeastern Russia, past the Caspian and Ural seas, northeastward and eastward through upper Turkestan and Siberia to Mongolia; from the Black sea to Bering sea and the Pacific ocean—the greater part, indeed, of Asia. Here we have a different geographic environment—a temperate but arid climate, vast steppes, where, on account of the drought, agriculture has always been impossible. Over these steppes immense flocks and herds of wild goats, camels, wild horses, and buffalo roam now as thousands of years ago. Here, in ages past, man, following where they led, gradually gathered them into herds and tamed and domesticated them. The herds must be cared for, be kept together, and guarded; goats and cows must be daily milked; must be pastured in summer, and the wild grass gathered for their winter use. Man learned to breed cattle, to increase his flocks and herds, for on them he depended for food, for clothing, for covering for his tents, and for all the other necessities of life. His environment forced him into habits of foresight, of thrift, of thoughtfulness; and thus man took the first step in civilization. He ceased to be a savage and became a nomad; he acquired property, and for thousands of years lived, as now, the shepherd's life. Flocks and herds belonged to the family or tribe, and the land where they grazed was regarded as the property of the tribe, from which the flocks and shepherds of other tribes were driven away.

Gradually the family relation was established. The father or his oldest or strongest son became the patriarch, and the families of a common ancestor were united into a tribe with the patriarch as its chief. Gradually the idea of social life and patriarchal government was developed, but there was neither city nor state,

no close contact of man with man, no assembling into communities. The men tended their flocks; the women learned to spin and weave; some ideas of individual rights were developed. The nomad condition of life gave form to his habitation—a tent easily moved.

From Asia we turn to Europe, a country from its geographic environment better adapted for the advancement of civilization than any other quarter of the world. Its two long, narrow peninsulas, Greece and Italy, stretch southward into the Mediterranean; its seacoast, longer in proportion to the land surface than that of any other continent, is indented with excellent harbors on the north and south, with deep bays and gulfs; its islands of Great Britain, its temperate climate, its abundant rainfall and numerous rivers, its mountain ranges, easily crossed, afford facilities for the development of trade and commerce, of science, the arts, and civilization of all kinds not possessed by any other country; yet this land, so well suited for the progress of civilization, was unfitted to be the birthplace of civilization.

The life of primitive man in Europe has been longer and more thoroughly studied than in any other part of the world. Traces of the different stages in the development of primitive man through the Stone, Bronze, and Iron ages have been found in many places. We learn of the life of the Drift and Cave men and of the time when they lived from their implements and from the bones of animals. Their implements resemble those found in other continents. This, however, does not prove the acquaintance of one race with the work of another in a different continent, but that similar stages of development occurring in different places and at different times, produce a like results. These implements, which are very rude and simple, are made of the stones most easily worked, and show by their design that they could have been made only by man. In France and England these remains have been found in the banks of streams 50, 80, or even 100 feet above the present level of the river. The men of this period belong to the earliest Stone Age, and are called "Drift men." Their implements are found with fauna extinct before our earliest knowledge of natural history and known to us only as fossils, or else with the remains of such animals as the reindeer and woolly rhinoceros, now found only in arctic or tropical climates.

These Drift and Cave men lived the life of all primitive men, hunting and fishing, or eating roots and the fruits of trees. Neither in their physical nor mental condition were they much

appear to be wild beasts among which they lived. They had

Great mounds, or cromlechs or barrows, as they are called. In

[illegible]

[illegible] and to prevent stress was placed with the owner, together with food for the same purpose.

The family relations and marriage were on their first coming, [illegible] the idea of property was scarcely more than that of the wild beasts. Many wild [illegible] protect their right of property in [illegible] they take and in the females of their kind.

We have no certain knowledge when these men lived, but the [illegible] thousands of years. They seemed to disappear from [illegible] and far-reaching in Asia as in Europe and America. Some [illegible] believe that man lived in the glacial period, others that the Irish men of Europe were conquered by man- [illegible] progress came from the influence of the Orient.

[illegible]

men of the Stone and Bronze Ages. The skulls of the Stone Age [illegible] who lived in a limestone or volcanic country, or where there were fissures and caves in the rocks, built their homes in the rocks and caves. In such places as the Marne [illegible]

The weapons they used were superior in workmanship and variety to those of the Irish men, being often ground and polished. Charred wood has been found in these caves, showing a knowledge of the use of fire, but no pottery.

For grandeur and strangeness the life of the Stone Age may

seem to us, it is not more unlike our own than that of many of the tribes who within the present generation have lived in South America, Africa, Asia, and the islands of the Pacific. There is scarcely a custom, a belief, or an implement of primitive man that has not been found among one or more of these tribes. The Fuegians have been described by Darwin and Captain Fitzroy, who as

"They are naked, except a sealskin which is thrown over the shoulders, live in a dome-shaped hut about the size of a hay stack, formed by branches of trees driven into the ground in a circle

with a hole for a window. They are also cannibals and live on fish or any other food they can find, frequently eating it raw,

of human flesh. They do not seem to have any form of government

or have traces of primitive religion. Here are found great tribes in

that also in the new age in the Baltic, whose waters, formerly salt, are now brackish, showing the long period that must have elapsed since the mounds were formed. Thus the aborigines bear testimony to that of the rocks as to the antiquity of the race.

Some geographic environment taught them navigation by the use of boats for fishing. The simplest form is a float, which may consist of a single log, a bundle of its branches, or of a great branch with the leaves remaining. Some races of

[illegible] this product in a little more than forming a float. The earliest means of propulsion was paddling with the hands and feet. Guiding was made of wind power, by holding up a leaf, bough, skin, or article of clothing as a sail, the craft being moved by one or two sticks. The mast and sail followed. The

[illegible] one and some great progress in shipbuilding. The

only the gradual evolution of the primitive log.

We have referred to the antiquities of the mound builders Stone Age from the East. We know that the Indian progress and civilization

would have been impossible. "No country," says Mommsen, "when first known by the historian, can certainly be said to occupy its original seat." No instance can be found where a

[illegible]

intermingling with races from other lands where different climates and surroundings have developed different intellectual activities. If, however, [illegible]

[illegible]

grant, then the inferior fades away, for scarcely a single race has been found that can bear the contact. It leaves to civilized we destroy.

[illegible]

people, with their vast herds of cattle. Few remain the amount

[illegible]

hunting and fishing required for his sustenance and that of his

[illegible]

In these regions man will ever remain content to be a savage or a barbarian. Where agriculture, trade, and industry are com-

[illegible]

in the state of Massachusetts of 2,500. One-fourth of the population of the world—savages and barbarians, our still numerous

[illegible]

support. As population increases the tribe invariably crowds

[illegible]

[illegible]

[illegible]

movement, or from the north to the south, have frequently occurred in the world's history. They have usually followed the same route, through passes and over plains to more fertile regions.

[illegible]

ered under great warriors, of whom we record names, left the plains of Asia, long before the time of Abraham or Abdu, and wandered over the steppes, through the Pass of Dariel in the Caucasus to Asia and on across Asia Minor and the Dardanelles to Greece, or else traveled across Russia, south of the Black Sea, into Hungary, and thence spread over Europe. These early tribes made belonged to the periods of the Stone and Bronze Ages, and met in Europe the men of the later Stone Age, and [illegible]

[illegible]

[illegible] into Europe, not as a progression from one stage to

[illegible] migrants drove their flocks and herds with them, for in the Bronze Age the larger proportion of the bones are those of domestic animals, while in the earlier Stone Age no bones of domestic animals are found, and very few in the later Stone

[illegible]

[illegible] council. How long this stagnation continued we cannot tell — [illegible]

and the races were mixed and contaminated with their [illegible]

We have found, in Equatorial Africa, in the Arctic regions

[illegible]

and by his pre-emptorial environment. It is to the east that we must look for transformations, which are indeed more [illegible] though [illegible]

[illegible] on land-locked by the Mediterranean, on the east and west

[illegible] merely influenced the religion of the people. The desert

[illegible]

[illegible]

[illegible] in [illegible] their daily lives become an object of worship.

More than [illegible] from the Nile to the valley of Al [illegible] stretches

[illegible]

gulf almost to the Mediterranean. Along the edge of the [illegible]

[illegible]

[illegible] the Persian gulf. The fauna and flora of this valley are very

[illegible]

[illegible] [illegible] two hundred fold in the lower and [illegible]

[illegible] [illegible] two hundred fold, with [illegible], barley, sesame, and rye.

[illegible]

[illegible] and abundant vegetation.

[illegible] site of the Valley of Baled is clearly marked. The region was [illegible]

[illegible] Food was abundant, but with the increase of population [illegible]

[illegible] and southward into the desert. The valley and the desert [illegible]

[illegible] contemporary writer says that "for hundreds of miles a traveler may walk from wall to wall, and housetop to housetop."

As there is little rainfall, the country was almost destitute of wood, and the river mud was used instead of wood and stone [illegible] also made of mud or bitumen, which is found here in large [illegible]

of bitumen was placed, until a solid roof was formed. Thus the architecture of the people here as elsewhere was the result of geographic environment.

[illegible]

were formed into communities. These grew into towns and great cities. The patriarchal system still remained, though with [illegible]

[illegible]

of life and death. With the increase of wealth, luxury, and [illegible]

[illegible]

The patriarch became a despot, the nomad a slave.

From the ruins of cities scattered all over the valley we learn much of the history of this people, their character, habits, and manner of life. In Nippur, the city most recently excavated by gentlemen connected with the University of Pennsylv[illegible] the debris over one of its temples is 87 feet in thickness, the [illegible]

[illegible] ordan writing lies far beneath the foundations of the temple of [illegible]

art is found at the beginning of Babylonian history."

[illegible]

He [illegible] with his renown and studied them from the [illegible]

[illegible]

mace." His capital was at [illegible] which was called "The C[illegible]

[illegible]

"the sea of the setting sun," and out into the Mediterranean to [illegible]

[illegible]

one hundred years after Sargon, Abraham went forth from Ur [illegible]

[illegible]

prisoner Abraham armed his servants, attacked Chedorlaomer and Tidal by night, smote them and rescued Lot.

About a thousand years before Sennacherib ruled, and about six hundred years before Christ, Nebuchadnezzar lived, [illegible] whom the Jews were [illegible] regarded "whom by the [illegible] [illegible] Bricks from the palace of Nebuchadnezzar with his name and titles and inscriptions, now [illegible]

[illegible]

was found with his name, some of them, such as Babylon and Nineveh, been and now the wonder of the world [illegible]

land of canals and roads." From the ruins of the city and [illegible]

[illegible] Two thousand years later, or 4,000 years before Christ, [illegible]

[illegible] of the statues the following inscription is found: "I to water-carrier in a basket of rushes, with bitumen, the door of my ark I so closed. She launched me on the river, which drowned me not [illegible]

me. After the water-carrier in the tenderness of his heart lifted me up. After the water-carrier made me his garden-[illegible] After my garden-[illegible] the goddess Ishtar loved me."

In Egypt, as bound by the sea and desert, there was no need of [illegible]

[illegible] was different. On one side were [illegible] and [illegible]

[illegible]

[illegible] people of different character. Their rulers were often [illegible]

[illegible]

to surround their cities with high and broad walls. Within [illegible]

[illegible]

with tribes, were founded, and civilization rose to the highest

[illegible]

[illegible] years ago.

When we personally see the wonderful cities that flourished in these [illegible]

[illegible]

[illegible] urge to see were that often had made the valley of the Euphrates [illegible]

[illegible]

Iron Age to the civilization of the present.

It is asked why, with the same geographic environment as [illegible] nations of the world, should have become a desert. We must take a look to the environment. On the eastern and northerly [illegible] of the plain, in its frequent inroads, killing the inhabitants. If the ruler was strong and powerful, slave were driven back to their mountains. If he was weak, his government was over-[illegible]

[illegible]

[illegible] and desolation followed. The sands from the desert

drifted in and the valley becomes a waste, rich only in broken monuments of old empires.

[illegible]

and the west, Europe and Asia. Over it great caravans were constantly passing, but it is carriage by camels which is slow, expensive, and usually human transports.

Columbus, in his efforts to find a better way to the East, discovered America. Magellan circumnavigated Africa and [illegible]

[illegible]

sailed through the Black Sea and Caspian Sea, but the route [illegible]

[illegible]

origin, and [illegible] are gradually finding their way from [illegible]

[illegible]

and west. When the Turkish rule is overthrown and a good [illegible]

[illegible] this valley may once more become one of the garden of the world.

The population of the valley of the Tigris and Euphrates travelled eastward into Persia and India over the mountains [illegible] and down the great rivers to the Persian, across the desert southward and up the Nile to the interior of Africa. From [illegible]

[illegible] for the Phoenicians, Greeks, Romans, Tyre and Sidon [illegible] Thus it was a new environment, for the ocean, modified [illegible] and commerce to the civilization of today.

The population of Mesopotamia, Syria, and Sidon and their [illegible] of the Euphrates valley. They had a determinate wealth, the patriarchal or despotic rule, with [illegible] freedom, and their work in advancing civilization which they [illegible]

[illegible] As their country and a different race came forward [illegible] and Sidon and the Semitic race, civilization moved westward to [illegible]

[illegible] barbarous and filled with idolatry. Instead of one great conqueror,

[illegible]

In [illegible], art, and [illegible], characterized with personal liberty and freedom of action, were adapted to the civilization of the [illegible]. In Greece and Italy it was on a small scale. Civilization needed a broader field, and from Greece it moved westward to [illegible]

[illegible] Roman civilization [illegible] imperial Augustus, the world [illegible] again to a single [illegible]. The Dark Ages followed, wherein the foundations of the states [illegible] the Renaissance, and then for a short time there was a [illegible] was turned back toward the [illegible] of the [illegible]. Constan- [illegible]

[illegible] the Dark Ages were past. With the Renaissance, civilization [illegible] World was carried on the great lines of travel to central and northern Europe.

With the Renaissance the lethargy of the Dark Ages was [illegible] exploration started on its westward course across the Atlantic to [illegible] the civilization of the future.

We have seen that at the early life of our race man was not only dependent on his environment, but a slave to it. As he [illegible] him. He not only rises superior to their power, but uses them [illegible] right to rule and become its master.

THE NATIONAL FOREST RESERVES

BY FREDERICK H. NEWELL,

Chief Hydrographer, United States Geological Survey

Recent discussions in Congress regarding forest reservations have drawn public attention to matters relating to forestry, and many questions are being asked as to the nature, location, and extent of the forest reserves. To answer these and similar questions it is necessary to have clearly in mind some fundamental facts in connection with the territory, with its resources, and its future.

The fact first in importance, and one that exists in our own [illegible] of the world. In the eastern half of the country [illegible] has been disposed of, and in the western half the government [illegible] is free to all citizens. In many of the states within [illegible] government. For example, in Nevada less than four per cent [illegible] has been reserved, over 96 per cent being still vacant. In Idaho less than seven per cent has been disposed of and about 6 per cent [illegible] reserved, a little over 86 per cent being vacant. Similar [illegible] relatively small population, over one-half of the area is

[illegible] obtained, in the same way as part of the western land of Nebraska, excepting along the Platte river.

It is not due to any lack of fertility that so much land is still in the hands of the general government. On the contrary, the greater part of this area has in it so far richer soil than that of the average farm lands of the east. Its value is due to the scarcity or the irregularity of distribution of moisture. As a rule it is arid and cannot be depended upon to produce crops each season unless artificially supplied with water. It

[illegible]

It must not be supposed that the soil, though fertile, is everywhere [illegible]

[illegible] diversified by the great mountain masses of the continent, [illegible] and on account of their altitude are precipitous and rugged [illegible] adjacent valleys. On the plateaux and ranges [illegible] at [illegible] of 7,000 feet and upward, where the moisture is sufficient, the desert plants are replaced by larger growth and [illegible] of small [illegible] and even in some forest [illegible]. This is especially true in the country to the north and west of the great [illegible] of [illegible], where the Sierra Nevada, Cascade, and Coast ranges are thickly clothed with forests [illegible] the process of gradual [illegible], it is [illegible] [illegible].

It has been estimated that in the aggregate there are on the [illegible] over 150,000,000 acres of land in these [illegible] which contain [illegible] are to be found. The gold belt cross here in large forests west [illegible] proper protection and conservation.

The first necessity of the pioneer in the West is water, next to [illegible] [illegible] in [illegible] forests [illegible] protected, more forest built

more fuel consumed and new mines are discovered and worked, wood in greater quantities is called for. The demand is over

the ability to obtain lumber, timber, or firewood at low prices, while the great distances between centers of population and the expense of transportation [illegible] West, the utilization

obtain the necessary wood near by, and with the relatively

growth, it has seemed important to perpetuate the wooded areas, so as to provide for the needs of time in our future.

It is not alone however as furnishing a supply of material for material purposes that the forests have to us. There

prevailing throughout the country that the water supply

[illegible] to a certain extent in quantity, and perhaps

West is worth [illegible] water can be carried on [illegible]

stock raising is also important, [illegible] water exists over the open range. Everyth[illegible], therefore, that affects the supply of w[illegible]

[illegible] of the land, the people of the United States. It would

[illegible], therefore, be a much wiser policy should be made to [illegible]

[illegible] the extent, value, and influence of the forest and to guard

the perpetuity of the supply of water and of wood.

[illegible] order to [illegible] a clear conception of the relative extent of

the woodland and forest of the West, the following table is in

serted, giving the area in acres of the several western states

[illegible] forest reserves, and also the extent of the forest, the woodland,

and the tree [illegible]. [illegible] is also added a table showing the

area of unreserved land in each of these [illegible]

[illegible]

[illegible] In this table the [illegible] has been apportioned

between the [illegible] heavy forests [illegible] part and that

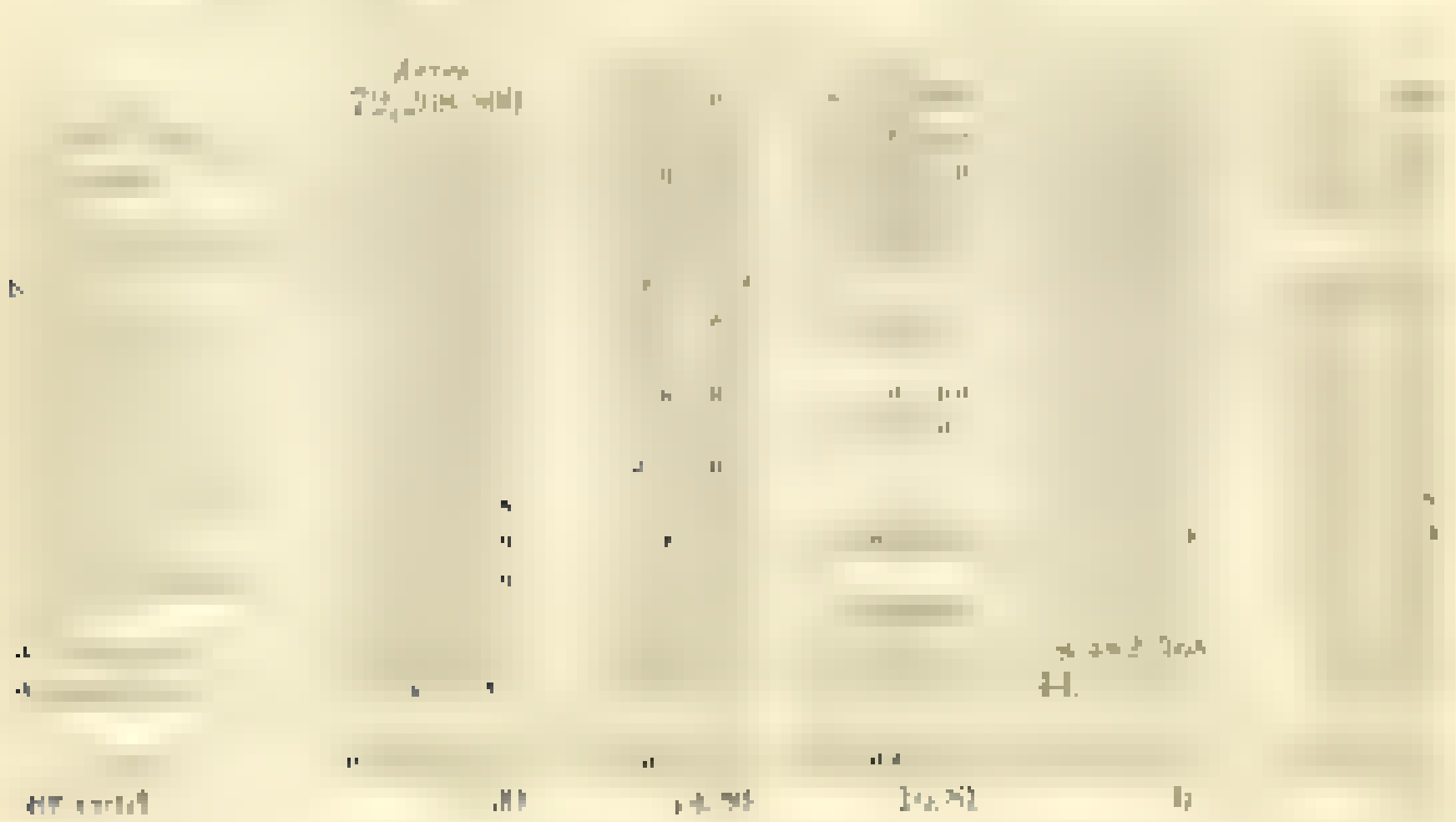
where the [illegible] of soil and climate [illegible] such [illegible]

[illegible] would be [illegible]. Such a distribution is, of course, [illegible]

[illegible], but for the present [illegible] it serves to

[illegible] general ideas.

Forest Wonderment, Forests and Improved Areas in Western Public-land States*

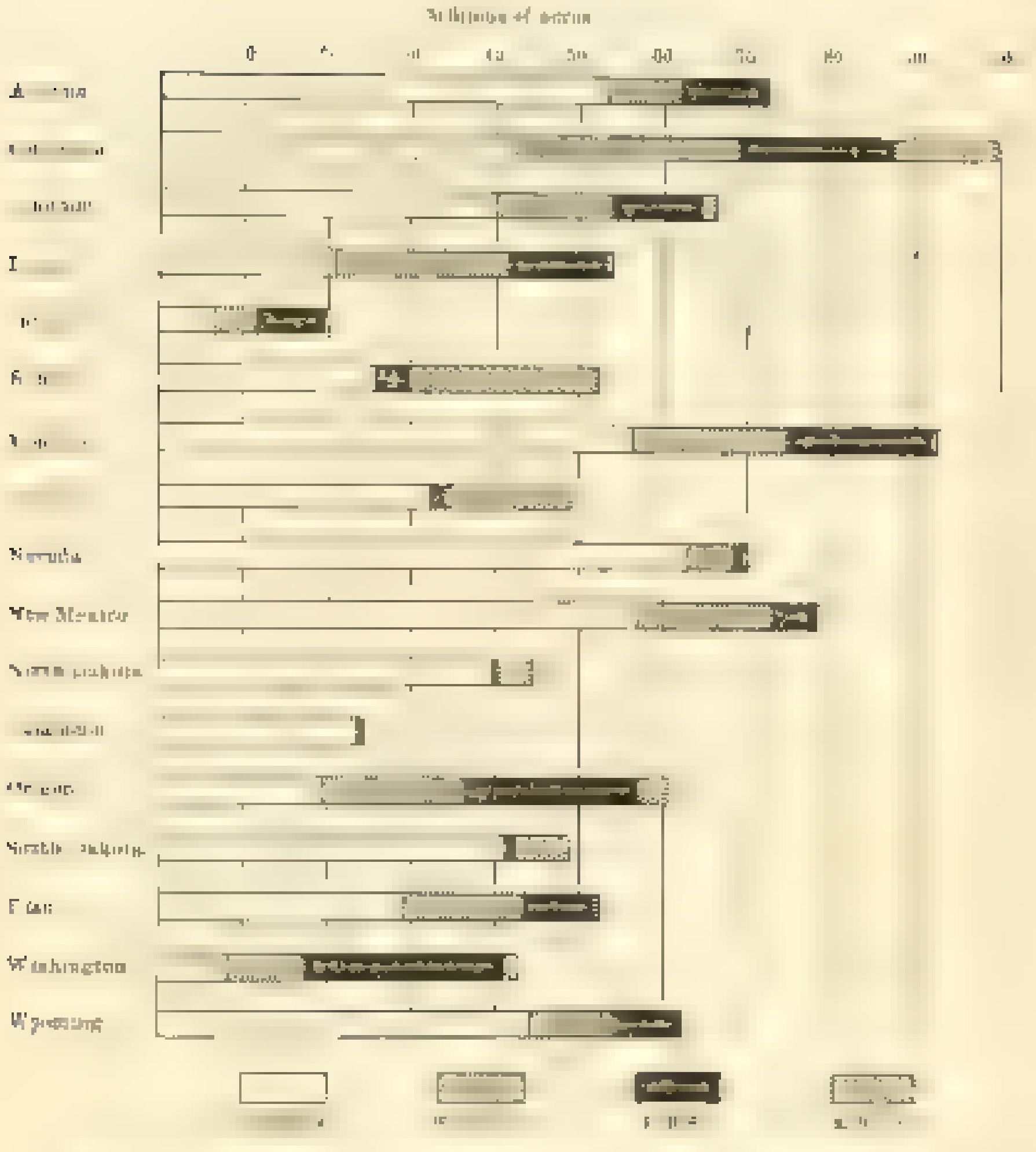


Report of the Secretary of Agriculture for the calendar year 1923, p. 5.
* Based on Forest Service Bulletin, Forest Wonderment, pp. 83, 84.

of land. The length of the horizontal line represents the number of

acres of the woodland, and the solid black portion of the forest. To the right of the [illegible] in Canada, is given the relative extent of improved land. In some of the [illegible] states data are so small that it can scarcely be [illegible]

* The Prairie Farm Rehabilitation Water Supply, by F. H. [illegible] Farmers' Bulletin 1046. Analysis [illegible] Survey, part II, p. 172.



[illegible] table of statistics showing the vote of each state and territory on [illegible], but varies from 3 to 50 per cent [illegible] even in one of these states and territories [illegible] of the population, as the vote of the remaining, are found to be [illegible] with that part which is [illegible]. The following [illegible] of Alaska, Hawaii, Porto Rico, Philippines, Guam, Samoa, Panama Canal Zone, Porto Rico, Virgin Islands, Tortola, Virgin Islands.

[illegible] conservation of floods, development of underground supplies, [illegible] may be useful as showing present conditions in the matter.

*Timber Lands in the Western Public-land States.**

States and Territories.	Wooded.		Millions of acres.		
	Square miles.	Acres.	Unreserved.	Reserved.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	5	
[illegible]	[illegible]	[illegible]	[illegible]	5	
[illegible]	[illegible]	[illegible]	[illegible]	11	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	21,177,600	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	11	[illegible]
Total.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

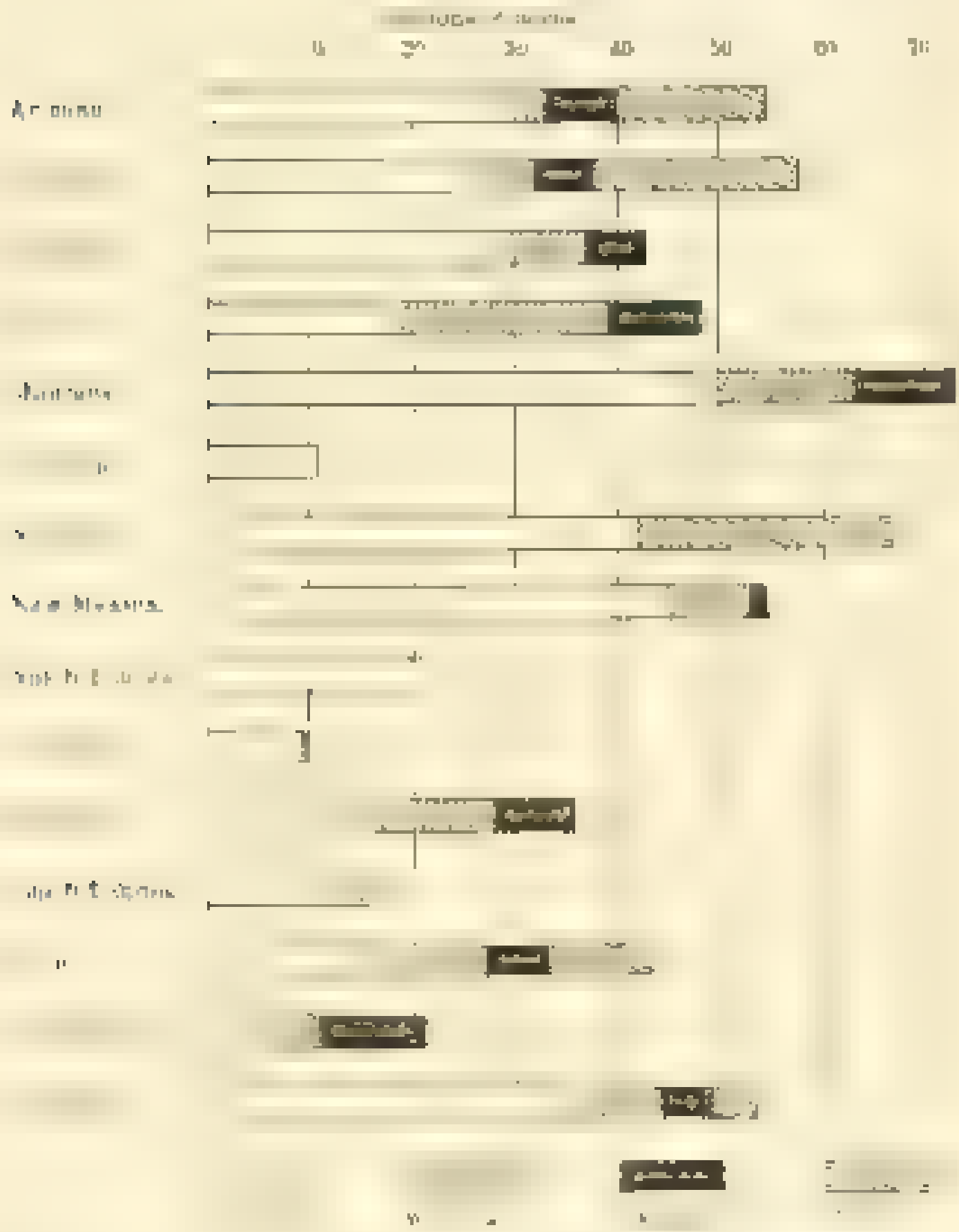
The following diagram has been prepared to show graphically the facts expressed by the figures in the foregoing table. By [illegible] that a considerable proportion of the forest areas has already passed out of the hands of the government, but that in round numbers about seventy million acres still remain, and though only about half of the whole extent of forest land, is a matter of great importance, especially as nearly all of this is included within

---

* The Public Lands and their Water Supply, p. [illegible]

the boundaries of the arid regions where wood and water have the highest value.

It is now generally accepted that only a small proportion of



Estimated or actual proportion of watershed in forest.

within these parts of the land have been so severe, except in forest-bearing watersheds. Agricultural and other land most productive is too valuable to be used for water, and on this is based the great bulk of the area of the West must remain [illegible] to be used for pastoral purposes or to be the grazing of flocks, where [illegible] are [illegible] these will thrive. The land

States must therefore continue to be a great land owner, unless these lands are disposed of wholesale to states or to corporations. The present conditions are now open, furnishing free pasturage to all persons who have cattle, horses, sheep, or goats, and the woodlands are almost equally free to be cut and burned by settlers. A few restrictions have been thrown, with the intent of preventing the wholesale depredation of the forests by lumber companies, but these have in the main been ineffective, the great companies being able to cut almost without limit.

The question may be asked, Why should not the government allow every one to take what timber he desires, as is the case of the mineral wealth, where mines, when found and operated, become the property of the discoverers, irrespective of their value? The fundamental difference between these two sources of wealth lies in provision for the future. In the case of mining, no amount of foresight will increase the quantity of mineral available for the next generation, but with the forests the reverse is the case. It has been argued by men familiar with the subject that, as matters are now proceeding, the timber supply of many localities will be entirely destroyed within a half generation, while with a moderate exercise of prudence the supplies may be made practically continuous, guaranteeing the perpetuity of many industries. As owners of the forests, the people of the United States should, from motives of prudence, see that these resources are not wasted, and still more, as owners of vast tracts of land dependent for irrigation to a greater or less degree upon the forests, should they make most strenuous exertions to intelligently preserve the latter.

But it may further be asked why any special steps need be taken to preserve the forests. Will not the local and individual interests be sufficient to guard against waste? The inter[illegible]

[illegible] wood land and [illegible] individual and present

[illegible]

In other words, while the farmer usually needs no interference or urging in maintaining the fertility of his wheat field and adopting methods that will secure the largest crop each year, he does require some strong incentive to maintain forests or woodlands in which he is not the small owner and from which the trees may be cut only once in a generation. An agency of longer life

[illegible]

than the individual—such an agency, for example, as is the state or nation

If we admit that something should be done to secure the perpetuity of the great part of our forests, the query at once arises as to what it should be and how we should go about it. The most direct way would undoubtedly be to at once reserve all forest [illegible] to take charge of them, to protect them from fire, to designate trees that may be cut, and to attend to the details of their [illegible] sustaining and would bring to the government a considerable [illegible] the natural attractions which draw tourists to remote parts of the country. But such a step involves many radical changes. The people as a whole are not educated up to it. Those in the West are afraid of interference in their concerns, and those of the [illegible] ther. Accordingly many bills have been introduced into Congress, but most of them failed from one cause or another. At length, after many failures, a clause was inserted in "An act to repeal [illegible] that the President of the United States may from time to time set apart and reserve in any state or territory [illegible] wholly or in part covered with timber or undergrowth, whether [illegible] dent shall, by public proclamation, declare the establishment of such reservations and the limits thereof.

The then Secretary of the Interior, the Hon. John W. Noble, [illegible] and through his active assistance the friends of the forestry movement were able to secure the proclamation by President Harrison of fifteen reservations, covering an aggregate area of over thirteen million acres. They then renewed their efforts to secure additional legislation and energetically supported the attempts made to pass laws allowing the reservations to be protected and

properly trained. Among others, the McRae bill (H. R. 119[illegible]

[illegible]

forest and is hard to replace [illegible]

[illegible]

practical upon a new line of schools. The American Forestry Asso-

[illegible]

press appropriating the sum of $25,000 for this purpose. Be

[illegible]

made "to enable the Secretary of the Interior to meet the ex-

[illegible]

of Congress on the inauguration of a national forestry policy for the forested lands of the United States." The [illegible] in a pamphlet by the President of the Academy at [illegible] look up the

[illegible]

of the Interior on February 1, 1897, [illegible] the establishment of thirteen national forest reserves. The recommendation was at once acted upon, and on February 22 [illegible] President proclaimed the forest reserves, containing an estimated area of over [illegible] million acres.

The conclusion in this preliminary report recognized the

[illegible]

the forests of the reservations, at least [illegible] principle, and as one of the arguments for making these reservations, the fact that a greater number of people are interested by the great [illegible] large [illegible] and [illegible] of lands which [illegible] interests [illegible] have not been [illegible] to [illegible] [illegible] "[illegible] the solution of the [illegible] problem of forest [illegible] [illegible], however, the [illegible] of reserved areas are now increased, as the greater [illegible] of persons interested in drawing supplies from the reserved territory [illegible] in them, the greater will be the pressure on Congress to enact laws permitting [illegible] [illegible]." The wisdom of this argument was [illegible] in the demand from [illegible] for [illegible]

action on the part of Congress. This demand resulted in the passage in the summer of that year of a law June, 1897,

while open to criticism in many directions, marks a constructive

of public timber

vations proclaimed on February 22, 1897. It is explicitly de-

except to improve and protect the forest within the reservation or for the purpose of securing favorable conditions of water flows, or to furnish a continuous supply of timber for the use and necessities of the United States; but it is not the purpose or intent of these provisions . . . to authorize the withdrawal of lands to forbid entry thereon or for agricultural purposes, but for forest purposes."

Authority is given to the Secretary of the Interior to make

and for the sale of dead, matured, or large growth of trees. On the other hand the rights of prospectors and miners are carefully guarded, by a statement that "nor shall anything herein prohibit a bona fide settler from entering upon such forest reservations for all proper and lawful purposes, including that of prospecting, locating, and developing the mineral resources, settlers in mills, residents, and prospectors may be permitted to use timber for firewood, fencing, building, mining, and agricultural purposes."

GEORGE W. MELVILLE

Rear Admiral, U. S. Navy

THE NATIONAL GEOGRAPHIC MAGAZINE presents herewith in its number a portrait of one of the most distinguished members of the Society of which we proved again at the Exposition in the City of New York during July 19, 1897, young Melville, after penetrating the Polar regions of Greenland, acquired

a thoroughly great engineer in the works of peace. In time of danger, stirred to patriotic effort by the outbreak of the rebellion, he entered the Navy July 29, 1861, and became an officer of the Engineer Corps of that service in the attempt to relieve Pensacola, commanded on a gunboat, Melville saw service on the Great Lakes, in the North Atlantic blockading squadron, at the capture of Norfolk, and in the operations on

Port Royal. His most conspicuous war service was performed

[illegible]

her machinery and the location of her machinery. In the capture of the *Florida* on a foggy morning, Melville displayed his instinct for battle, and was one of the three [illegible] wounded on the

[illegible]

management of the service for professional skill, executive ability, energy, and zeal. . . . It is no disparagement to his fellows to say that he has not his superior to his equals."

The dangers of war past, Melville sought the first opportunity for patriotic service elsewhere, and volunteering for service in the Tigress, formed one of a rescue party for the missing crew of the *Polaris*. The Tigress, under Lieutenant Greer, rescued the deserted crew of the *Polaris* near Lat. 80° 11′, and on the return of the voyage fell largely owing to Melville's great force of character, combined with thorough practical knowledge.

His most conspicuous service was under Lieut. D. W. Taylor in the *Jeannette*, which attempted to solve the polar problem by forcing a way. As will be recalled, the *Jeannette*, September, 1879, drifted accidentally to the northward and was crushed by icebergs and sank June 12, 1881, in 77° 15′ N., 155° E. During this period in dangerous drift Melville's resources and his effective work as officer were conspicuously displayed; now it was a series of expedients, a problem which saved from foundering the sinking *Jeannette*, again it was physical endurance

[illegible]

that enabled him to return and survey the

[illegible]

of the Lena discoveries. It was under the most desperate conditions, however, that Melville supported and aided his chief as never pro-

[illegible] and [illegible]—when the *Jeannette* sank five hundred miles [illegible] from Lena Delta.

Lieutenant Chipp [illegible] and Lieutenant Chipp [illegible] Long's [illegible] was an Irishman named Melvin, who was well, strong, energetic, and a fitting [illegible] It was necessary to have on the dangers and hardships which [illegible] the proposed journey, combined on the members of the party, which were met with fortitude, courage, and energy that [illegible] the successful issue one of the most [illegible] of the history of man overcoming obstacles almost [illegible] It may be said that in [illegible] Lieutenant Chipp [illegible] on the right arm of Mr. Long, was [illegible] and experiments [illegible] the Long's [illegible] to Melville, that, when [illegible] under his orders, a sailor Donenhower was placed thereon [illegible] boat's crew was the only one that was saved. [illegible] perishing of sen and Mr. Long in the Lena Delta. When Mr. Long's desperate condition became known, it was Melville's [illegible] and personal duty to attempt to rescue the unconscious [illegible] recovered the remnant of Mr. Long's [illegible] his crew and [illegible] for the [illegible] Congress in [illegible] and [illegible] fifteen [illegible] successfully [illegible] the party under his command after the wreck of the Arctic [illegible] *Jeannette*, and [illegible] his persistent efforts, through dangers [illegible] to find and rescue the [illegible] officer and other members of the [illegible] notwithstanding he himself was out of [illegible]."

[illegible] of the [illegible] Franklin [illegible] expedition, which [illegible] of [illegible] attention [illegible] orders to Capt. [illegible] and when the government refused to [illegible] proposal [illegible] Melville [illegible] in [illegible] of the [illegible] to search [illegible] Long's remnant of the expedition [illegible] and [illegible] the [illegible] his service afloat.

[illegible] in 1887 as Chief Engineer of the Navy with the rela-

[illegible]

a degree of [illegible] has endeared the admiration of the world

[illegible]

[illegible]

[illegible]

GEOGRAPHIC SERIALS

The Journal of the Royal Colonial Institute for May contains an extremely interesting article, entitled "Western Canada Before and Since Confederation," by Sir Donald A. Smith. It is a presentation of the history of the region which is now the central of the Hudson's Bay Company's territories of Canada.

The January number of the same Journal contains a paper on the "Labour of Labour," by Sir Gilbert T. Carter. It is mainly a history of the [illegible]

The Scottish Geographical Magazine for May contains an article by Sir [illegible], entitled "Some Results of the Norwegian Arctic Expedition," [illegible] of Dr. [illegible]. It contains a special account of a trip to Mount Tarawera in New Zealand, with an account of the topographic changes produced by its great eruption in 1886. These are illustrated by a map showing the present topography of the surrounding region.

The June number of The Scottish Geographical Magazine contains the [illegible] of the Earl of Dalhousie on the "Geographical Distribution of Forest Trees in Canada," Mr. W. [illegible] Kent writes on "The Market Fishes and Marine Commercial Product of America."

The Geographical Journal contains several articles of interest. Nansen [illegible] in the "Scientific Results of the Norwegian Arctic Expedition," [illegible] "The Niger-Quorra in Portuguese Guinea" is described by Capt. F. R. Matson. [illegible] "The Exploration of the Dangerous Forests" is described by Mr. [illegible] "Russian Expeditions in Turkestan."

The Quarterly Journal of the Royal Geographical Society contains a number of articles of interest, among them "The Government Program of the Australian Colonies," by Mr. W. Harper, which is accompanied by a rainfall map; "Meteorology of Queensland," by Mr. Clement L. Wragge; "The Sierra Chiriqui," by Mr. Isaac Bowen; and "The Nicaragua Canal as Proposed by the Maritime Canal Company," by the same gentleman. "The Canals and Navigable Rivers of England," by Mr. Lionel R. [illegible].

The Earth, a Sketch of Its Life and Death," by Mr John H. Newby; "Physiography of Northern Lumberman," by Mr Herbert Bolton

[illegible]

[illegible] "Ice Fog," by Mr G. H. Pettengill. Instead of giving a narrative of the expedition, this article contains a summary of the Magnetic and Dead Reckoning observations.

The Sierra Club Bulletin for May opens with an article on "The Coast Range [illegible]" contributed by Helen M. Gompertz, entitled "Up and Down Big Sur Coast," and Mr Horace Cort Brown concludes his "Wanderings in [illegible]."

The Journal of Geology for February-March contains an article by Prof [illegible] deposits of Lake Bonneville. The same journal for April-May continues [illegible] "Glacial Studies in Greenland" of Prof T. C. Chamberlin.

The Journal of the Typhoon Geographical Society for May devotes its first [illegible] pages to Dr Morse's explorations. For the rest it contains a narrative of a journey in Benin by James Monnick and T. R. Auchterlonie, and [illegible] papers of [illegible] read before the society.

E. W.

NOTES FROM THE SOCIETY, SESSION 1896-'97

Special Meeting, May 7, 1897.—President Hubbard in the chair. Mr Warner Dwight Wilson read a paper, with lantern illustrations, on Japan, its Scenery and Deep Life, in the Church of the Ascension.

Annual Meeting, May 14, 1897.—President Hubbard in the chair. The Treasurer read a progress report and the report of the Auditing Committee, showing the prosperous state of the Society's finances. The report of the Committee on Nominations, consisting of Messrs W. A. De Caudin, H. C. Clarke, and N. A. Arthur, was read, and the following gentlemen were duly elected: Mr Marcus Baker, Col. H. F. Bryant, Lieut. E. Hayden, U. S. N., Dr C. Hart Merriam, and Prof. W. J. Powell were nominated members of the Board of Managers, and Mr Frederick V. Coville, Botanist of the U. S. Department of Agriculture, was elected in place of Mr J. R. Weist, who now is nominated director in Cuba, in succession for the District of Columbia, preventing his from allowing himself for re-election. The report of the Nominating Committee was adopted, and the following officers were duly elected:

Special Meeting, May 21, 1897.—President Hubbard in the chair. The [illegible] concerning exploration in Mammoth Cave. Mr Hugh Hefner and President [illegible] Military, Major Joel Hayden [illegible]

[illegible] *Excursion and Field Meeting, May 27, 1907.* — A [illegible] members and guests went by special train, leaving Washington at [illegible] a. m., via Alexandria and Three Lines Junction, to Manassas, Va. [illegible] a field meeting was held in the open and [illegible] Maryland [illegible] date, and papers were read by Major Jed Hotchkiss on War History, Mr. M. B. Chamberlin on the Geology and Topology of the Region, and [illegible] of Washington, N. G. Lunch was served, after which an address of Mr. Mulkey, in the open air, was made by some of the party to a few remaining high knolls to the south-west. The return to Washington was made at 4.40 p. m., arriving at [illegible] p. m.

[illegible] *Meeting, June 11, 1907.* — Vice-President [illegible] a certain in the chair. The annual report of the Recording Secretary was read and [illegible] The annual report of the Treasurer was read and referred to the Auditing Committee. The Recording Secretary stated that as the [illegible] notice of pending amendments to the By-Laws had been sent to members [illegible] to [illegible] from the city, they could not properly come up for final action at that meeting. Said amendments were as follows:

Article V. Add: "No [illegible] shall be required of ex-members on [illegible] of their reinstatement to membership. Annual dues shall be [illegible] for the current year in the case of [illegible] after the [illegible] of January, or within [illegible] days before that date, and they shall be [illegible] for the current year in the case of the [illegible] in April and May, upon payment of $1 dues for the following year."

[illegible] "Shall be [illegible] as now be made, at the discretion of the Board of Managers, in the annual dues of [illegible] elected in April and May" [illegible] "within thirty days after election" payment of dues by new members, and add "[illegible] of election, and no [illegible] death of [illegible]

[illegible] "A [illegible] may be [illegible] and [illegible] by [illegible] of fifty dollars" add "[illegible] or, by ex-members or members [illegible] payment of one hundred dollars."

Add "Suitable restrictions may be made in the loan of tackle and [illegible] to members in arrears."

Article VI. Omit: "The Board of Managers shall set apart a time and [illegible]

Article VII. [illegible] "[illegible] the management of all be kept to all [illegible] of the society" insert "not in arrears of dues." Add at end [illegible] of Managers."

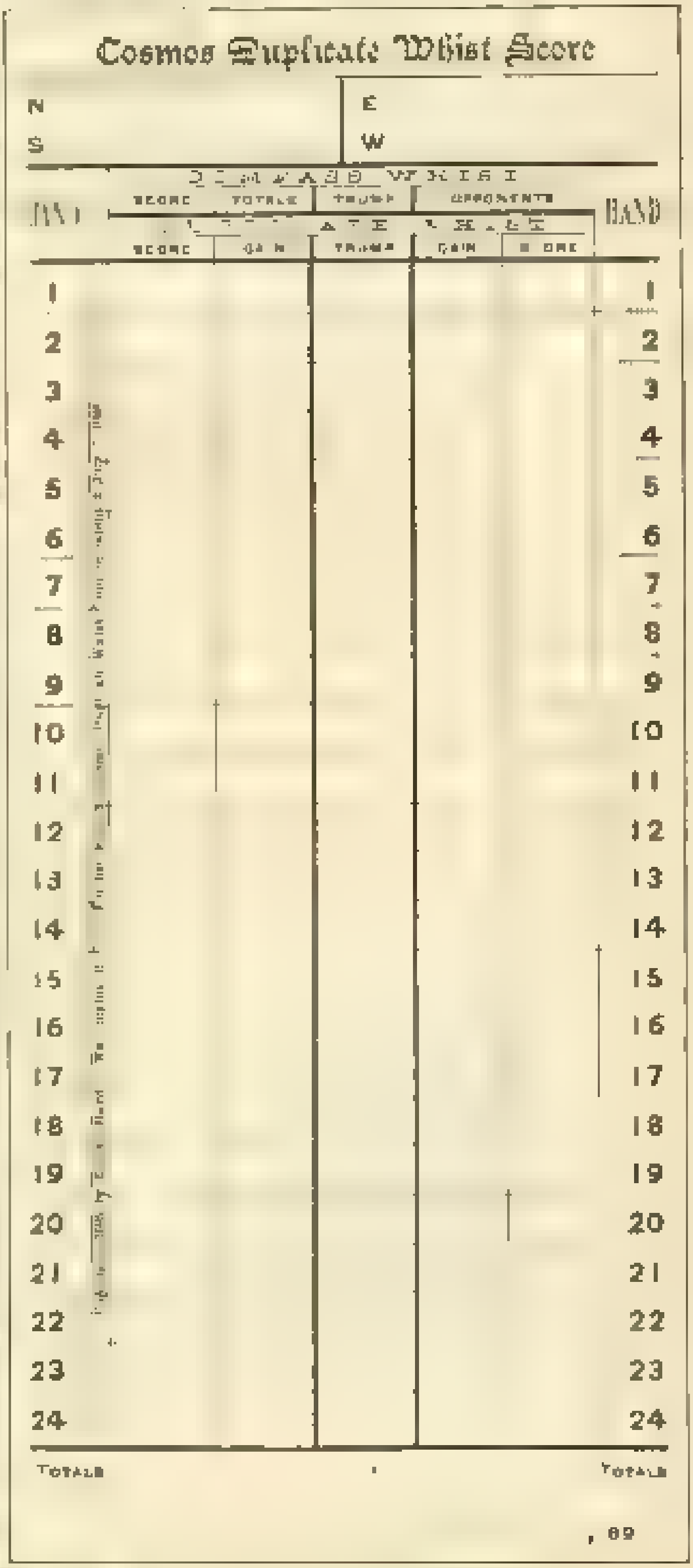
[illegible] Hardy, Everett L. Harvey, Prof. Jos. V. Jackson, John P. Logan, Hon. [illegible] Herbert Wright.

June 11. — L. E. Brown, Lieut. J. B. Cahoon, U. S. N., [illegible]

From Theodore Roosevelt, Miss Louise Taylor

AN IMPROVED METHOD OF KEEPING THE SCORE IN

DUPLICATE WHIST COMPASS WHIST, STRAIGHT WHIST AND EUCHRE.



E. MORRISON PAPER CO., 1000 Penna. Avenue, Washington, D. C.

Among the Contents of Forthcoming Numbers of

THE NATIONAL GEOGRAPHIC MAGAZINE

WILL BE THE FOLLOWING:

The Deserts and Forests of Arizona,

By PROF. B. E. FERNOW, Ph. D., LL. D., etc.,

(Chief of the Division of Forestry, U. S. Department of Agriculture.)

Down the Volga, from Nijni Novgorod to Kazan,

By PROF. FREDERIC W. TAYLOR.

—AND—

Several of the geographical papers to be presented at the Toronto Meeting of the British Association for the Advancement of Science.

TIMES & NEWSPAPER PRINTING HOUSE, WASHINGTON, D. C.